

## ABSTRACT OF THE DISCLOSURE

A method and apparatus for minimizing system deterioration caused by polarization effects (e.g., a polarization-dependent gain (PDG), a polarization-dependent loss (PDL), and a polarization mode dispersion (PMD)). The apparatus performs a signal modulation process to enable one bit to simultaneously contain two orthogonal polarization components, resulting in a minimum DOP (Degree Of Polarization). If a signal undergoes the PMD, the apparatus converts an NRZ (Non Return to Zero) signal into an RZ (Return to Zero) signal, resulting in minimum inter-symbol interference caused by the PMD. The apparatus can improve a performance of an optical signal during the PMD operation, whereas a conventional PMD compensation technique has been designed to remove system deterioration caused by only the PMD.